



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

January 25, 2018

Mr. Bryan Hanson
Senior Vice President, Exelon Generation
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – INTEGRATED INSPECTION
REPORT 05000289/2017004

Dear Mr. Hanson:

On December 31, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Three Mile Island, Unit 1 (TMI). On January 19, 2018, the NRC inspectors discussed the results of this inspection with Mr. Tom Haaf, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented one finding of very low safety significance (Green) in this report. This finding did not involve a violation of NRC requirements.

If you disagree with the cross-cutting aspect assignment or the finding not associated with a regulatory requirement in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I, and the NRC Resident Inspector at Three Mile Island.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and the NRC's Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Silas R. Kennedy, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Docket No. 50-289
License No. DPR-50

B. Hanson

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05000289/2017004

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U.S. NUCLEAR REGULATORY COMMISSION**REGION I**

Docket No: 50-289

License No: DPR-50

Report No: 05000289/2017004

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Dates: October 1 through December 31, 2017

Inspectors: Z. Hollcraft, Senior Resident Inspector
B. Lin, Resident Inspector
J. Furia, Senior Health Physicist
J. DeBoer, Emergency Preparedness Inspector

Approved by: S. Kennedy, Chief
Reactor Projects Branch 6
Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report 05000289/2017004, 10/01/2017-12/31/2017; Three Mile Island, Unit 1, Integrated Inspection Report.

This report covered a three-month period of inspection by resident inspectors and announced inspections performed by regional inspectors. Inspectors identified one finding of very low safety significance (Green). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP), dated November 15, 2016. Cross-cutting aspects are determined using IMC 0310, "Aspects Within Cross-Cutting Areas," dated December 4, 2014. All violations of Nuclear Regulatory Commission (NRC) requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Cornerstone: Initiating Events

- Green. The inspectors documented a self-revealing finding involving the failure to follow LS-AA-125, "Corrective Action Program," Revision 14. Specifically, the licensee failed to take appropriate corrective actions to correct degraded control rod drive mechanism cable connections identified during a 2010 stuck rod event. This resulted in a rod drop event on October 10, 2017, that caused a turbine runback to 55 percent and required a plant shutdown to repair. As an immediate corrective action, the licensee replaced the Bendix 7-pin electrical connector for the control rod drive mechanism (CRDM) and performed extent of condition visual and resistance checks on the other CRDM cables. The issue was entered into their corrective action program (CAP) as issue report (IR) 04061160.

The performance deficiency is more-than-minor because it was associated with the equipment performance attribute of the Initiating Events cornerstone and adversely affected the objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. Specifically, a transient resulting from a dropped rod challenged the critical safety function of reactivity control. The inspectors determined that this finding was of very low safety significance (Green) since it did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant to a stable shutdown condition.

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because despite indications of degradation during inspections in 2013 and 2015, the site failed to ensure that a resolution addressed the cause commensurate with its safety significance (P.2). (Section 1R12)

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period shutdown in refueling outage (1R22), which started on September 18, 2017. Operators took the reactor critical on October 8 and reached 72 percent power before having to shut the reactor down to perform repairs on the control rod drive system on October 11. Following repairs, operators returned the unit to 100 percent power on October 12. The unit remained at or near 100 percent power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 – 1 sample)

.1 Readiness for Seasonal Extreme Weather Conditions

a. Inspection Scope

The inspectors performed a review of Exelon's readiness for the onset of seasonal low temperatures on December 11, 2017. The review focused on borated water storage tank heat tracing and industrial coolers. The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR), technical specifications, control room logs, and the CAP to determine what temperatures or other seasonal weather could challenge these systems, and to ensure Exelon personnel had adequately prepared for these challenges. The inspectors reviewed station procedures, including Exelon's seasonal weather preparation procedure and applicable operating procedures. The inspectors performed walkdowns of the selected systems to ensure station personnel identified issues that could challenge the operability of the systems during cold weather conditions. Documents reviewed for each section of this inspection report are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns (71111.04Q – 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems:

- Protected system lineup on the intermediate closed cooling system on October 7, 2017
- Emergency Feedwater system following the scheduled 1R22 outage on October 20, 2017
- 2 hour backup air supply banks for the Emergency Feedwater System on December 8, 2017

The inspectors selected these systems based on their risk-significance relative to the reactor safety cornerstones at the time they were inspected. The inspectors reviewed applicable operating procedures, system diagrams, the UFSAR, technical specifications, work orders, issue reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have impacted system performance of their intended safety functions. The inspectors also performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and were operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. The inspectors also reviewed whether Exelon staff had properly identified equipment issues and entered them into the corrective action program for resolution with the appropriate significance characterization.

b. Findings

No findings were identified.

.2 Full System Walkdown (71111.04S – 1 sample)

a. Inspection Scope

On October 7, the inspectors performed a complete system walkdown of accessible portions of the core flood system to verify the existing equipment lineup was correct prior to the conclusion to the 1R22 outage. The inspectors reviewed operating procedures, surveillance tests, drawings, equipment line-up check-off lists, and the UFSAR to verify the system was aligned to perform its required safety functions. The inspectors also reviewed electrical power availability, component lubrication and equipment cooling, hangar and support functionality, and operability of support systems. The inspectors performed field walkdowns of accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no deficiencies. Additionally, the inspectors reviewed a sample of related issue reports and work orders to ensure Exelon appropriately evaluated and resolved any deficiencies. The inspectors confirmed that systems and components were aligned correctly, free from interference from temporary services or isolation boundaries, environmentally qualified, and protected from external threats. The inspectors also examined the material condition of the components for degradation and observed operating parameters of equipment to verify that there were no deficiencies. For identified degradation the inspectors confirmed the degradation was appropriately managed by the applicable aging management program.

b. Findings

No findings were identified.

1R05 Fire Protection

.1 Resident Inspector Quarterly Walkdowns (71111.05Q – 5 samples)

a. Inspection Scope

The inspectors conducted tours of the areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that Exelon controlled combustible materials and ignition sources in accordance with administrative procedures. The inspectors verified that fire protection and suppression

equipment was available for use as specified in the area pre-fire plan, and passive fire barriers were maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for out of service, degraded, or inoperable fire protection equipment, as applicable, in accordance with procedures.

- Auxiliary Building, elevation 331', engineered safety features ventilation building on October 1, 2017
- Reactor Building, all areas (RB-FZ-1A, 1B, 1C, 1D, 1E, 2, and 3), on October 6, 2017
- Intermediate Building, elevation 295', EF-P-1 area (IB-FZ-2), on October 20, 2017
- Auxiliary Building, elevation 281', makeup valve alley (AB-FZ-3), on November 3, 2017
- Auxiliary Building, elevation 281', shield wall area (AB-FZ-4), on November 3, 2017

b. Findings

No findings were identified.

1R07 Heat Sink Performance (711111.07A – 1 sample)

a. Inspection Scope

The inspectors reviewed the 'D' secondary closed cooler to determine its readiness and availability to perform its risk significant functions. The inspectors reviewed the design basis for the component and verified Exelon's commitments to NRC Generic Letter 89-13, "Service Water System Requirements Affecting Safety-Related Equipment," were being maintained. The inspectors observed actual inspections of the heat exchanger reviewed. The inspectors discussed the results of the most recent inspection with engineering staff and reviewed the as-found and as-left conditions. The inspectors verified that Exelon initiated appropriate corrective actions for identified deficiencies. The inspectors also verified that the number of tubes plugged within the heat exchanger did not exceed the maximum amount allowed.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program and Licensed Operator Performance (71111.11Q – 2 samples)

.1 Quarterly Review of Licensed Operator Regualification Testing and Training

a. Inspection Scope

The inspectors observed licensed operator simulator training on October 31, 2017, which included a steam generator tube rupture coincident with a loss of offsite power and the failure of select components to automatically start as required. The inspectors evaluated operator performance during the simulated event and verified completion of risk significant operator actions, including the use of abnormal and emergency operating procedures. The inspectors assessed the clarity and effectiveness of communications, implementation of actions in response to alarms and degrading plant conditions, and the oversight and direction provided by the control room supervisor. The inspectors verified the accuracy and timeliness of the emergency classification made by the shift manager and the technical specification action statements entered by the shift technical advisor. Additionally, the inspectors assessed the ability of the crew and training staff to identify and document crew performance problems.

b. Findings

No findings were identified.

.2 Quarterly Review of Licensed Operator Performance in the Main Control Room

a. Inspection Scope

The inspectors observed control room operations in support of reactor startup and synchronizing the turbine to the grid conducted on October 7, 2017, and October 8, 2017. The inspectors observed licensed operators performance to verify that procedure use, crew communications, and coordination of activities between work groups met the criteria specified in Exelon's OP-AA-1, "Conduct of Operations," Revision 1. In addition, the inspectors verified that licensee supervision and management were adequately engaged in plant operations oversight and appropriately assessed control room operator performance and similarly met established expectations and standards.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 5 samples)

a. Inspection Scope

The inspectors reviewed the samples listed below to assess the effectiveness of maintenance activities on structure, system, or component (SSC) performance and reliability. The inspectors reviewed system health reports, corrective action program documents, maintenance work orders, and maintenance rule basis documents to ensure that Exelon was identifying and properly evaluating performance problems within the scope of the maintenance rule. For each sample selected, the inspectors verified that the SSC was properly scoped into the maintenance rule in accordance with Title 10 of the *Code of Federal Regulations* (CFR) 50.65 and verified that the (a)(2) performance criteria established by Exelon staff was reasonable. As applicable, for SSCs classified as (a)(1), the inspectors assessed the adequacy of goals and corrective actions to return these SSCs to (a)(2). Additionally, the inspectors ensured that Exelon staff was identifying and addressing common cause failures that occurred within and across maintenance rule system boundaries.

- Instrument air system on October 28, 2017
- Reactor building ventilation on October 30, 2017
- Rod control system on December 15, 2017
- Train C make up pump quality related maintenance on December 20, 2017
- Main feedwater pumps on December 28, 2017

b. Findings

Introduction. The inspectors documented a green self-revealing finding involving the failure to follow LS-AA-125, "Corrective Action Program," Revision 14. Specifically, the licensee failed to identify and correct degraded control rod drive mechanism cable connections.

Description. On October 10, 2017, Unit 1 was at 72 percent power while ascending to full power following a refueling outage. Control rod 5-7 dropped from 100 percent withdrawn to fully inserted, the plant responded as expected; the integrated control system automatically ran back turbine power to 55 percent and reactor power followed. Operators established hot shutdown conditions to troubleshoot and repair the dropped rod. The root cause (IR 04061160) was determined to be long term degradation of the neoprene insulator for the Bendix 7-pin electrical connector face. This allowed moisture into the connector which accelerated corrosion and localized heating and shorted the electrical pins.

In February 2010, the licensee experienced a blown fuse for rod 8-7 and performed an apparent cause evaluation (IR 01036542) that concluded that the connector exhibited corrosion-based damage, resulting in deposits that provided electrical contact between the pins internal to the female connector. The evaluation noted that the connectors “are in a high temperature, high humidity environment with over 30+ years of operation” and recommended that the station “consider evaluating the environmental condition in which the female connector resides in service, and determine if a connector less prone to water intrusion would be more beneficial.” Lastly, the licensee noted that there was a “high probability” that the remaining 61 connectors were degraded. Due to the likelihood of widespread degradation, a recommended corrective action was to “replace each of the 61 CRDM connectors.” This option was not taken due to “cost of rework and project schedule impact.” Instead, meggering and resistance checks were utilized to attempt to identify degraded connections; however, these failed to identify rod 5-7 as degraded prior to the 2017 event. Visual inspections in 2007, 2013, and 2015 all documented corrosion on the connector face, but these were attributed to exposure during outages and each time it was cleaned and tested for resistance with no further action to determine or correct the cause of the corrosion.

LS-AA-125, Revision 14, the CAP procedure in effect at the time, defined a condition adverse to quality as an “all-inclusive term” that included “deficiencies”. It went on to define corrective action as “an action taken to restore a condition adverse to quality to an acceptable condition.”

Following the dropped rod in October 2017, the licensee replaced the damaged connector, including the insulation and performed extent of condition visual and resistance checks on the other CRDM cables to ensure no other cables exhibited signs of imminent failure. An action to replace seven connectors that have a history of corrosion or high resistance during the next forced outage has been initiated. A corrective action to prevent reoccurrence is to develop a refueling outage preventative maintenance procedure to inspect and test the replacement connectors such that the licensee can accurately assess their health.

Analysis. The inspectors determined that the failure to identify and correct degraded CRDM connectors is a performance deficiency that was within the capability of Exelon to foresee and correct and should have been prevented. Specifically LS-AA-125 Revision 14 required that corrective actions restore “a Condition Adverse to Quality to an acceptable condition,” contrary to this, the licensee failed to take adequate corrective actions to address the degraded connectors. The performance deficiency is more-than-minor because it was associated with the equipment performance attribute of the Initiating Events cornerstone and adversely affected the objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. Specifically, a transient resulting from a dropped rod challenged the critical safety function of reactivity control.

In accordance with Exhibit 1 of IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, the inspectors determined that this finding was of very low safety significance (Green) since it did not cause both a reactor trip and the loss of mitigation equipment relied upon to transition the plant to a stable shutdown condition.

This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because despite indications of degradation during inspections in 2013 and 2015, the site failed to ensure that a resolution addressed the cause commensurate with its safety significance (P.2).

Enforcement. The performance deficiency does not involve a violation of regulatory requirements so one is not associated with this finding. Exelon's immediate corrective actions included replacing the degraded connection, performing an extent of condition evaluation of the other connectors and entering this issue into their CAP as IR 04061160.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 5 samples)

a. Inspection Scope

The inspectors reviewed station evaluation and management of plant risk for the maintenance and emergent work activities listed below to verify that Exelon performed the appropriate risk assessments prior to removing equipment for work. The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that Exelon personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When Exelon performed emergent work, the inspectors verified that operations personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work and discussed the results of the assessment with the station's probabilistic risk analyst to verify plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

- Reduced inventory during steam generator nozzle dam installation on October 4, 2017
- Emergent repair activity of the digital control rod drive system on October 11, 2017
- Increased risk during turbine driven emergency feedwater pump scheduled maintenance on October 25, 2017
- Increased risk during train 'A' emergency diesel scheduled maintenance on November 7, 2017
- Yellow risk during service water screen house de-silting operations on November 13, 2017

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15 – 5 samples)

a. Inspection Scope

The inspectors reviewed operability determinations for the following degraded or non-conforming conditions based on the risk significance of the associated components and systems:

- 'A' train once through steam generator loose anchor bolts evaluation documented in issue report 04055111 on September 22, 2017
- Turbine driven emergency feedwater pump oiler issue documented in issue report 04067056 on October 26, 2017
- 'C' make up pump orifice issue documented in issue report 04058842 on November, 1, 2017
- Air leak on the 2 hour back-up instrument air system documented in issue report 02598124 on December 8, 2015
- Emergency diesel lubricating oil storage issue documented in issue report 04072933 on November 9, 2017

The inspectors evaluated the technical adequacy of the operability determinations to assess whether technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and UFSAR to Exelon's evaluations to determine whether the components or systems were operable. The inspectors confirmed, where appropriate, compliance with bounding limitations associated with the evaluations. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled by Exelon.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed Engineering Change Package 593900, temporary modification to supply alternate reference leg to pressurizer level instrument RC-LT-777 on November 22, 2017, to determine whether the modifications affected the safety functions of systems that are important to safety. The inspectors reviewed 10 CFR 50.59 documentation and post-modification testing results, and conducted field walkdowns of the modifications to verify that the temporary modifications did not degrade the design bases, licensing bases, and performance capability of the affected systems.

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19 – 8 samples)

a. Inspection Scope

The inspectors reviewed the post-maintenance tests for the maintenance activities listed below to verify that procedures and test activities adequately tested the safety functions that may have been affected by the maintenance activity, that the acceptance criteria in the procedure were consistent with the information in the applicable licensing basis and/or design basis documents, and that the test results were properly reviewed and accepted and problems were appropriately documented.

The inspectors also walked down the affected job site, observed the pre-job brief and post-job critique where possible, confirmed work site cleanliness was maintained, and witnessed the test or reviewed test data to verify quality control hold point were performed and checked, and that results adequately demonstrated restoration of the affected safety functions.

- 'B' emergency diesel generator following 1R22 outage on September 27, 2017
- 'A' train decay heat removal pump following seal maintenance on October 1, 2017
- Digital turbine control system adjustments during plant startup on October 8, 2017
- 'A' feedwater pump (FW-P-1A) following repairs on SV-8 (trip solenoid) on October 10, 2017
- Repairs to cable for control rod drive mechanism 48 following dropped rod on October 11, 2017
- Flex diesel outlet breaker replacement on October 18, 2017
- Emergency Feedwater control and block valves following maintenance on October 20, 2017
- 'A' train emergency diesel following ring catcher drain modification on November 8, 2017

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20 – 1 sample)

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Unit 1 refueling outage (1R22), which was conducted on September 18, 2017 through October 8, 2017. Subsequently, the station entered a maintenance outage (1F11) conducted on October 11, 2017 through October 12, 2017 to perform repairs on the control rod drive system. The inspectors reviewed Exelon's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable technical specifications when taking equipment out of service
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing

- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting
- Status and configuration of electrical systems and switchyard activities to ensure that technical specifications were met
- Monitoring of decay heat removal operations
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss
- Activities that could affect reactivity
- Maintenance of containment as required by technical specifications
- Fatigue management
- Tracking of startup prerequisites, walkdown of the reactor building/containment to verify debris had not been left which would block the emergency core cooling system suction strainer, and startup and ascension to full power operation
- Identification and resolution of problems related to outage activities

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 7 samples)

a. Inspection Scope

The inspectors observed performance of surveillance tests and/or reviewed test data of selected risk-significant SSCs to assess whether test results satisfied technical specifications, the UFSAR, and Exelon procedure requirements. The inspectors verified that test acceptance criteria were clear, tests demonstrated operational readiness and were consistent with design documentation, test instrumentation had current calibrations and the range and accuracy for the application, tests were performed as written, and applicable test prerequisites were satisfied. Upon test completion, the inspectors considered whether the test results supported that equipment was capable of performing the required safety functions. The inspectors reviewed the following surveillance tests:

- Local leak rate testing on radioactive waste containment isolation valves WDL-V-534 and 535 on September 26, 2017
- In service test of Train B nuclear river pump and associated valves, October 15, 2017
- In service test of turbine driven emergency feedwater pump on October 25, 2017
- In service test of normal make-up containment isolation valve MU-V-18, October 25, 2017
- In service test of emergency feedwater control and block valves, EF-V-30s and EF-V-52s, on October 26, 2017
- Engineered safeguards system quarterly logic testing on November 28, 2017
- Emergency loading sequence and high pressure injection logic channel/component test surveillance frequency control program change on December 4, 2017

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04 – 1 sample)

a. Inspection Scope

Exelon implemented various changes to the Three Mile Island Emergency Action Levels (EALs), Emergency Plan, and Implementing Procedures. Exelon had determined that, in accordance with 10 CFR 50.54(q)(3), any change made to the EALs, Emergency Plan, and its lower-tier implementing procedures, had not resulted in any reduction in effectiveness of the Plan, and that the revised Plan continued to meet the standards in 50.47(b) and the requirements of 10 CFR 50 Appendix E.

The inspectors performed an in-office review of all EAL and Emergency Plan changes submitted by Exelon as required by 10 CFR 50.54(q)(5), including the changes to lower-tier emergency plan implementing procedures, to evaluate for any potential reductions in effectiveness of the Emergency Plan. This review by the inspectors was not documented in an NRC Safety Evaluation Report and does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety. The requirements in 10 CFR 50.54(q) were used as reference criteria. The specific documents reviewed during this inspection are listed in the Attachment.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06 – 2 samples)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of routine Exelon emergency drills on October 24, and October 31, 2017, to identify any weaknesses and deficiencies in the classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator and technical support center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the station drill critiques to compare inspector observations with those identified by Exelon staff in order to evaluate Exelon's critique and to verify whether the Exelon staff was properly identifying weaknesses and entering them into the corrective action program.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstone: Occupational and Public Radiation Safety

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08 - 6 samples)

a. Inspection Scope

The inspectors verified the effectiveness of Exelon's programs for processing, handling, storage, and transportation of radioactive material. The inspectors used the requirements of 49 CFR 170-177, 10 CFR 20, 61, and 71, applicable industry standards, Regulatory Guides, and procedures required by technical specifications as criteria for determining compliance.

Inspection Planning

The inspectors conducted an in-office review of the solid radioactive waste system description in the UFSAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed. The inspectors reviewed the scope of quality assurance audits performed for this area since the last inspection.

Radioactive Material Storage (1 sample)

The inspectors observed radioactive waste container storage areas, verified the postings and controls, and verified that Exelon had established a process for monitoring the impact of long-term storage of the waste.

Radioactive Waste System Walkdown (1 sample)

The inspectors walked down the following:

- Accessible portions of liquid and solid radioactive waste processing systems to verify current system alignment and material condition
- Abandoned in place radioactive waste processing equipment to review the controls in place to ensure protection of personnel
- Changes made to the radioactive waste processing systems since the last inspection
- Processes for mixing and transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers
- Current methods and procedures for dewatering waste

Waste Characterization and Classification (1 sample)

The inspectors identified radioactive waste streams and reviewed radiochemical sample analysis results to support radioactive waste characterization. The inspectors reviewed the use of scaling factors and calculations to account for difficult-to-measure radionuclides.

Shipment Preparation (1 sample)

The inspectors reviewed the records of shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness.

Shipping Records (1 sample)

The inspectors reviewed selected non-excepted package shipment records.

Problem Identification and Resolution (1 sample)

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were identified at an appropriate threshold and properly addressed in Exelon's CAP.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

4OA2 Problem Identification and Resolution (71152 – 3 samples)

.1 Routine Review of Problem Identification and Resolution Activities

a. Inspection Scope

As required by Inspection Procedure 71152, "Problem Identification and Resolution," the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that Exelon entered issues into the corrective action program at an appropriate threshold, gave adequate attention to timely corrective actions, and identified and addressed adverse trends. In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the corrective action program and periodically attended issue report screening and management meetings. The inspectors also confirmed, on a sampling basis, that, as applicable, for identified defects and non-conformances, Exelon performed an evaluation in accordance with 10 CFR 21.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a semi-annual review of site issues, as required by Inspection Procedure 71152, "Problem Identification and Resolution," to identify trends that might indicate the existence of more significant safety issues. In this review, the inspectors included repetitive or closely-related issues that may have been documented by Exelon outside of the CAP, such as trend reports, performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or CAP backlogs. The inspectors also reviewed Exelon's corrective action program database for the third and fourth quarters of 2017 to assess issue reports written in various subject areas (equipment problems, human performance issues, etc.), as well as, individual issues identified during the NRC's daily issue report review (Section 4OA2.1). The inspectors reviewed trends reported for the third and fourth quarters of 2017 to verify that Exelon personnel were appropriately evaluating and trending adverse conditions in accordance with applicable procedures.

b. Findings and Observations

No findings were identified.

The inspectors reviewed previous trends to ensure they had been appropriately addressed by the licensee. Specifically, an adverse trend in emergency planning drill and exercise performance related to notification of state and local authorities had been documented under issue report 04025781. The performance indicator related to this trend has shown improvement in the months since this was first documented; however, some deficiencies have still been noted by the licensee, specifically documented in issue report 04070093. The inspectors will continue to monitor this trend to ensure the licensee's actions have completely addressed any performance issues.

The licensee also documented a trend related to industrial safety (issue reports 04017619; 04047110; 04058290) that has been revealed through OSHA reportable injuries and other minor mishaps and near-misses. Inspectors substantiated this trend through corrective action documents and log reviews and reviewed the licensee's actions to address these concerns to ensure their adequacy and continue to monitor their effectiveness.

.3 Annual Sample: Turbine bypass valve testing criteria (Issue Report 02589911)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's evaluation and corrective actions associated with issue report 02589911, an NRC identified discrepancy between testing acceptance criteria for turbine bypass valves and design basis documents. Specifically, testing procedure IC-57.1 specified an acceptance criteria for stroke time of 3.5 seconds, but design basis documents state that the time should be 3 seconds.

The inspectors assessed Exelon's implemented and planned corrective actions to evaluate whether Exelon staff appropriately identified, characterized, prioritized, and corrected the issues. The inspectors compared the actions taken to the requirements of Exelon's CAP. The inspectors interviewed engineering personnel to gain an understanding of the implemented and planned corrective actions associated with this issue. The inspectors also performed a walk down of a portion of the turbine building.

b. Findings and Observations

No findings were identified.

The inspectors determined that the licensee appropriately classified the significance of the issue following its discovery. The licensee reviewed previously performed tests to ensure that the operability of the turbine bypass valves was always maintained. Previous testing data did confirm that the valves consistently open below the 3 second design basis criteria despite the higher acceptance criteria in the procedure. As a corrective action, the licensee reviewed design basis documents to confirm the 3 second criteria was correct and revised their procedures to incorporate this. This was done by procedure change request 02447409 completed in May, 2016.

.4 Annual Sample: DH-C-1B Shell Inlet Control Valve (DC-V-2B) Long Term Corrective Actions (Issue reports 3948387; 4053268; 4056346; and 4057460)

a. Inspection Scope

The inspectors performed an in-depth review of Exelon's long-term corrective actions regarding degraded performance and controllability of DH-V-2B, the inlet control valve to the B decay cooling heat exchanger. Specifically, the valve was sluggish to respond and did not accurately respond in the low end control band, which challenged operators in maintaining optimal cooldown rate during the 1M10 maintenance outage. These issues were documented in representative issue reports 3948387; 4053268; 4056346; and 4057460.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent of condition reviews, compensatory actions, and the prioritization and timeliness of Exelon's corrective actions to determine whether Exelon was appropriately identifying, characterizing, and correcting problems associated with these issues and whether the planned or completed corrective actions were appropriate.

The inspectors compared the actions taken to the requirements of Exelon's CAP and 10 CFR 50, Appendix B. In addition, the inspectors performed field walkdowns and interviewed operations, maintenance, engineering personnel to assess the effectiveness of the implemented corrective actions.

b. Findings and Observations

No findings were identified.

Inspector review of UFSAR, operability determination, technical specifications, and operating procedures determined that DC-V-2B satisfactory operation is integral to its engineered safety function of cooling the reactor cooling system when required for outages or placing the plant in safe shutdown. Exelon determined the valve controls needed retuning and recalibration, which amounted to limited success. Troubleshooting determined the most probable causes were issues with the internals of the valve when responding in its low end of the valve position demand. Exelon recalibrated and performed diagnostic testing in the refueling outage 1R22. However, subsequent valve testing and control room operator observations determined the valve demonstrated the same behavior at the low end position demands. Exelon performed additional calibration and implemented operations department guidance to operate DC-V-2B until a modification to can be performed. Exelon continues to operate DC-V-2B under previously established controls and classified it as an operator challenge. It has no effect on its safety related function and position of fully opening to place the plant in cold shutdown.

4OA6 Meetings, Including Exit

On January 19, 2018, the inspectors presented the inspection results to Tom Haaf, Plant Manager, and other members of Exelon's staff. The inspectors verified that no proprietary information was retained by the inspectors or documented in this report.

ATTACHMENT: SUPPLEMENTARY INFORMATION

SUPPLEMENTARY INFORMATION**KEY POINTS OF CONTACT**Exelon Personnel

| | |
|--------------|--------------------------------------|
| E. Callan | Site Vice President |
| T. Haaf | Plant Manager |
| T. Alvey | Manager, Chemistry |
| D. Atherholt | Outage Manager |
| R. Campbell | Manager, Site Security |
| D. Divittore | Manager, Radiological Engineering |
| M. Fitzwater | Senior Regulatory Assurance Engineer |
| J. Valent | Senior Manager, Plant Engineering |
| J. Pickett | Emergency Preparedness Manager |
| M. Morrow | Radiation Protection Technician |
| R. Myers | Fire Marshal |
| T. Orth | Outage Director |
| B. Shumaker | Manager, Emergency Preparedness |
| J. Sinopoli | Fire Protection Program Engineer |
| C. Sinn | Radwaste Shipper |

Other Personnel

| | |
|-----------|--|
| S. Martin | Nuclear Safety Specialist Pennsylvania Department of Environmental Protection Bureau of Radiation Protection |
|-----------|--|

LIST OF ITEMS OPENED, CLOSED, DISCUSSED, AND UPDATEDOpened/Closed

| | | |
|---------------------|-----|--|
| 05000289/2017004-01 | FIN | Failure to correct degraded control rod connections (Section 1R12) |
|---------------------|-----|--|

LIST OF DOCUMENTS REVIEWED**Section 1R01: Adverse Weather Protection**Procedures

1104-46, Electric Heat Tracing, Revision 65
 1420-HT-1.3, Heat Trace Replacement, Revision 5
 MA-TM-1003, Snow and Ice Removal Plan-TMI, Revision 6
 WC-AA-107, Seasonal Readiness, Revision 17

Miscellaneous

Memo 5500-2017-0016, Certification of 2017/18 Three Mile Island Generating Station Winter Readiness, November 15, 2017

Issue Reports:

| | | |
|----------|----------|----------|
| 02607617 | 02609417 | 02611119 |
|----------|----------|----------|

Section 1R04: Equipment Alignment

Procedures

OP-TM-424-000, Emergency Feedwater System, Revision 13

Drawings

302-082, Emergency Feedwater flow diagram, Revision 25

Section 1R05: Fire Protection

Procedures

1038, Administrative Controls-Fire Protection Program, Revision 76

1303-12.24, Raceway Fire Barrier Inspection, Revision 17

1440-Y-14, Fire Barrier Envelopes and REHS Repair/Installation, Revision 18

OP-MA-201-007, Fire Protection System Impairment Control, Revision 6

AB-FZ-3, Pre-Fire Plan, Makeup Valve Alley, Revision 2

AB-FZ-4, Pre-Fire Plan, Shield Wall Area, Revision 4

AB-FZ-11, Pre-Fire Plan, ESF Ventilation Area, Revision 0

IB-FZ-2, Intermediate Building Elevation 295', Revision 7

IB-FZ-3, Intermediate Building Elevation 295', Revision 6

RB-FZ-1A, Reactor Building Elevation 281' North Outside D-ring, Revision 1

RB-FZ-1B, Reactor Building Elevation 281' South Outside D-ring, Revision 1

RB-FZ-1C, Reactor Building Elevation 281' Southwest Outside D-ring, Revision 1

RB-FZ-1D, Reactor Building Inside "A" D-ring, Revision 1

RB-FZ-1E, Reactor Building Inside "B" D-ring, Revision 1

RB-FZ-2, Reactor Building Elevation 308' Outside D-ring, Revision 1

RB-FZ-3, Reactor Building Elevation 346' Outside D-ring, Revision 1

Miscellaneous

CC-AA-309-101, Engineering Technical Evaluations, Revision 11

Letter No. 1920-30248, Appendix R Exemption Request (TAC NO. M97747)

Issue Reports: 04071647

Work Order: R2226830

Section 1R07: Heat Sink Performance

Procedures

ER-TM-340-1001, TMI Generic Letter 89-13 Program Basis Document, Revision 2

Issue Reports: 04069790 04070571

Section 1R11: Licensed Operator Regualification Program

Procedures

OP-AA-1, Conduct of Operations, Revision 1

OP-Tm-310-401, Controlling Procedure for Physics Testing, Revision 6

1102-1, Plant Heatup to 525F, Revision 181

1102-2, Plant Startup, Revision 163

1103-8, Approach to Criticality, Revision 55

Miscellaneous

TMI1C22-1.00, Reactivity Management Plan for reactor startup, October 7, 2017

Section 1R12: Maintenance EffectivenessProcedures

ER-AA-310, Implementation of the Maintenance Rule, Revision 9

ER-AA-310-1005, Maintenance Rule – Dispositioning between (a)(1) and (a)(2), Revision 7

ER-TM-310-1001, TMI Guidance for Maintenance Rule Unavailability Monitoring, Revision 5

LS-AA-125, Corrective Action Procedure, Revision 14

Drawings

1311000505, Control Schematic AR VFS, PWS, N4EB, AR(8), RSS/L, P/A, OLS, Revision G

1310739937, Elec Cube Assy, Revision G

Miscellaneous

Memo From Exelon Power Labs, Failure Analysis of Oil Resetting Solenoid Valve SV-8 from Main Feed Pump, December 1, 2017

System Health Report for the Instrument Air System

| | | | | | |
|----------------|----------|----------|----------|----------|----------|
| Issue Reports: | 01680194 | 02658957 | 04003542 | 04031587 | 01036542 |
| | 04059266 | 04061529 | 04031912 | 04021479 | 04021488 |
| | 02579767 | | | | |

| | | |
|-------------|---------|---------|
| Work Order: | 4664264 | 4651611 |
|-------------|---------|---------|

Section 1R13: Maintenance Risk Assessments and Emergent Work ControlProcedures

1082.1, TMI Risk Management Program, Revision 8

1301-9.7, Intake Pump House Floor, Silt Accumulation and Inspections, Revision 29

CC-TM-118-1001, TMI Diverse and Flexible Coping Strategy (FLEX) and Spent Fuel Pool Instrumentation Program Document, Revision 3

WC-AA-101, On-Line Work Control Process, Revision 18

OP-TM-108-117-1001, Three Mile Island Protected Equipment Program, Revision 4

OU-TM-103, TMI-1 Shutdown Safety Management, Revision 10

Miscellaneous

TMI-1 Shutdown Safety Management Plan for 1R22, August 23, 2017

Issue Reports 04066519

Work Orders: 04658482 04667556

Section 1R15: Operability EvaluationsProcedures

OP-AA-108-115, Operability Determinations, Revision 10

OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability Determinations, Revision 2

Miscellaneous

1107-3, Diesel Generator, Revision 149
 C-1101-852-5360-004, Two Hour Backup Instrument Air System As-Built Capacity Calculation and Evaluation, Revision 3a
 EC 621649, Technical Evaluation – ‘A’ OTSG Anchor Bolt Past-Operability Evaluation, Revision 0
 VT-ISI-2017-044, Visual Examination of Component Supports and Snubbers, September 24, 2017

Issue Reports:

02598124 04055111 04056688 04057654 04057656 04072933

Section 1R18: Plant Modifications

Procedures

CC-AA-102, Design Input and Configuration Change Impact Screening, Revision 20
 CC-AA-103, Configuration Change Control, Revision 21

Miscellaneous

ECR 593933, Temporary modification – supply alternate reference leg to RC-LT-777

Issue Report:

04073995

Section 1R19: Post-Maintenance Testing

Procedures

1303-4.16, Emergency Power System, Revision 142
 OP-TM-424-203, IST of EF-P-1 and Valves, Revision 17
 OP-TM-424-212, IST of EF-V-30s and EF-V-52s, Revision 9
 OP-TM-212-213, DH-P1A Refueling IST, Revision 7

Drawings

302-082, Emergency Feedwater flow diagram, Revision 25

Miscellaneous

| | | | | | |
|----------------|----------|----------|----------|----------|----------|
| Issue Reports: | 04057932 | 04060668 | 04060673 | 04072231 | |
| Work Orders: | 04687828 | 04187275 | 04669607 | 04696607 | 04697536 |

Section 1R20: Refueling and Other Outage Activities

Procedures

1015, Equipment Storage Inside Class 1 Building—RB Sump Clogging Post-LOCA, Revision 7
 1101-3, Containment Integrity and Access Limits, Revision 93A
 1102-1, Plant Heatup to 525F, Revision 181
 1102-2, Plant Startup, Revision 163
 1102-10, Plant Shutdown, Revision 099
 1102-11, Plant Cooldown, Revision 153B
 1103-8, Approach to Criticality, Revision 55
 1103-11, RCS Water Level Control, Revision 072
 1104-15D, Fuel Handling E.S.F Ventilation System, Revision 26

1503-1, Receipt of New Fuel and Control Components, Revision 36
 1505-1, Fuel and Control Component Shuffle, Revision 62
 1507-1, Polar Crane Operation, Revision 27
 ER-TM-470-1000, TMI-1 Transient Cycle Logbook Guideline, Revision 2
 MA-AA-716-008, FME Program, Revision 011
 MA-TM-460-001, Planned Containment Entry-TMI 1, Revision 2
 NF-AA-330-1001, Core Verification Guideline, Revision 11
 OP-AA-108-108-1001, Drywell/Containment Closeout, Revision 1
 OP-AA-390, Spent Fuel Pool Material Control, Revision 0
 OP-AP-4001, PWR Fuel and Core Component Handling Practices, Revision 14
 OP-TM-108-108-1008, TMI-1 Supplement to OP-AA-108-108, Revision 17
 OP-TM-220-261, Reactor Coolant System VT-2 Exam, Revision 010
 OP-TM-220-567, Drain Cold Leg(s) to RCBT via RC Drain Pump, Revision 004A
 OP-TM-300-205, Shutdown Margin for Hot Shutdown Conditions, Revision 004
 OP-TM-300-206, Shutdown Margin for Low Temperature Conditions, Revision 003
 OP-TM-310-401, Controlling Procedure for Physics Testing, Revision 6
 SA-AA-111, Heat Stress Control, Revision 16

Miscellaneous

2 Month Review of Outage Readiness, July 2017
 Individual Fatigue Assessment, dated October 3, 2017
 Individual Fatigue Assessment, dated October 4, 2017
 PORC Meeting 2017-13, dated August 23, 2017
 Schedule Reports for Maintenance T1R22, September 17, 2017 to October 14, 2017
 Schedule Reports for Operations T1R22, September 17, 2017 to October 14, 2017
 Shutdown Safety Management Plan for T1R22, August 23, 2017
 Reactivity Management Data Sheet for T1R22, August 30, 2017
 Reactivity Management Data Sheet for T1R22, October 6, 2017

Drawings

1E-153-02-002, General Arrangement Reactor Building 308'-0", Revision 6
 1E-153-02-001, General Arrangement Reactor Building 281'-0", Revision 8

| | |
|------------------|----------|
| Condition Report | 00388006 |
| Work Order | 04373207 |

Section 1R22: Surveillance Testing

Procedures

1303-4.11, HPI/LPI Logic and Analog Channel Test, Revision 60
 OP-TM-211-242, MU-V-18 Stroke Test for IST, Revision 8
 OP-TM-424-000, Emergency Feedwater System, Revision 13
 OP-TM-424-203, IST of EF-P-1 and Valves, Revision 17
 OP-TM-424-212, IST of EF-V-30s and EF-V-52s, Revision 9
 OP-TM-541-232, IST of NR-P-1B and Valves - Multiple Pump Operations, Revision 10
 WC-TM-430, Surveillance Testing Program, Revision 0
 WC-TM-430-1001, Surveillance Testing Program Database Interface and Maintenance,
 Revision 1
 ER-AA-425-1003, Surveillance Frequency Control Program – Integrated Decision Making Panel
 (IDP) Roles and Responsibilities, Revision 2

Drawings

302-202, Nuclear Services River Water System, Revision 82
302-082, Emergency Feedwater flow diagram, Revision 25

Miscellaneous

eSOMS clearance section 17-1-424-0007, revision 1
ECR 02-00212, EF-U-1 Larger Governor Oiler, Revision 1
TM-17-004, Surveillance Test Interval Evaluation Form, Revision 0

Work Orders:

04659076 04667556 04667985 04682166 04352296 04371912

Condition Reports:

04067056 04080235

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Miscellaneous

EP-AA-1009, Addendum 3, Emergency Action Levels for Three Mile Island Station, Revision 2
EP-AA-1009, Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island Station, Revision 26

Section 1EP6: Drill Evaluation

Procedures

EP-AA-111, Emergency Classification and Protective Action Recommendations, Revision 19
EP-AA-112-100-F-01, Shift Emergency Director Checklist, Revision Y
EP-AA-112-200-F-01, Station Emergency Director Checklist, Revision N

Miscellaneous

TQ-TM-104EP-2015-1, EP Drill 2015-1, Revision 1
TQ-TM-104EP-2017-1, EP Drill 2017-1, Revision 1
Three Mile Island Generating Station Emergency Preparedness Drill Scope of Participation, October 24, 2017
Three Mile Island Generating Station Emergency Preparedness Drill Scope of Participation, October 31, 2017

Condition Reports:

04070093 04070101 04070111 04070118 04070157

Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

Exelon Procedures:

RP-AA-600, Rev 16, Radioactive Material/Waste Shipments
RP-AA-600-1001, Rev 9, Exclusive Use and Emergency Response Information
RP-AA-600-1002, Rev 6, Highway Route Controlled Quantity/Advanced Notification for Radioactive/Waste Shipments
RP-AA-600-1003, Rev 10, Radioactive Waste Shipments to Barnwell and the Defense Consolidation Facility (DCF)
RP-AA-600-1004, Rev 13, Radioactive Waste Shipments to Energy Solution's Clive Utah Disposal Site Containerized Waste Facility
RP-AA-600-1005, Rev 19, Radioactive Material and Non Disposal Site Waste Shipments

RP-AA-600-1006, Rev 11, Shipment of Category 1 Quantities of Radioactive Material or Waste (Category 1 RAMQC)
RP-AA-600-1007, Rev 8, Radioactive Waste Shipments to Energy Solution's Clive Utah Disposal Facility Bulk Waste Facility (BWF)
RP-AA-600-1008, Rev 5, Radioactive Waste Shipments to Waste Control Specialists (WCS) Disposal Facility
RP-AA-600-1009, Rev 2, Shipment of Category 2 Quantities of Radioactive Material or Waste (Category 2 RAMQC)
RP-AA-600-1010, Rev 2, Use and Operation of WMG Software for Creating Containers, Samples, Waste Streams and Waste Types
RP-AA-600-1011, Rev 4, Use and Operation of WMG Software for Gross Gamma Characterization and Generation of Shipping Paperwork
RP-AA-600-1012, Rev 2, Use and Operation of WMG Software for Direct Sample Characterization and Generation of Shipping Paperwork
RP-AA-600-1013, Rev 2, Use and Operation of WMG Software RAMSHP
RP-AA-600-1014, Rev 2, Use and Operation of WMG Software Filter Module
RP-AA-600-1015, Rev 3, Use and Operation of WMG Software for Outage Service Module
RP-AA-600-1016, Rev 0, Use and Operation of the WMG Software for Characterization of Miscellaneous Items
RP-AA-601, Rev 20, Surveying Radioactive Material Shipments
RP-AA-602, Rev 20, Packaging of Radioactive Material Shipments
RP-AA-602-1001, Rev 17, Packaging of Radioactive Material/Waste Shipments
RP-AA-602-1002, Rev 0, Loading Dry Active Waste and Other Waste Forms for Energy Solutions Waste Acceptance Guide (WAG-501)
RP-AA-602-1003, Rev 1, Radioactive Materials/Waste Shipments Transported Via Rail
RP-AA-603, Rev 10, Inspection and Loading of Radioactive Material Shipments
RP-AA-605, Rev 7, 10 CFR 61 Program
RP-TM-605-1005, Rev 0, 10CFR61 Waste Stream Sampling
RP-AA-607, Rev 5, Radioactive Material Shipped in Accordance With IATA requirements
RP-AA-631, Rev 1, Dry Active Waste Generation and Reduction
RP-AA-6001, Rev 2, Transport Accident Response
RP-TM-600-1005, rev 4, Requesting Shipment of Non-Waste Radioactive Material
RP-TM-601-1002, Rev 1, Fuel Receipt and Handling
RW-AA-100, Rev 12, Process Control Program for Radioactive Wastes
RW-AA-103, Rev 0, Request for Disposal of Radioactive Waste
RW-AA-104, Rev 5, Radwaste Storage Facility/Waste Container Inspections
RW-AA-105, Rev 8, Guidelines for Operating an Interim On site Low-Level Radioactive Waste Storage Facility
RW-AA-120, Rev 2, Radwaste Processing Input Control Program
RW-AA-1000, Rev 6, Radwaste Monthly Report Guidelines

Quality Assurance/Quality Control:

NOSA-TMI-16-04, Chemistry, Radwaste, Effluent and Environmental Monitoring Audit
DAC-0384, Three Mile Island Nuclear Station Unit 1 Sample Program Evaluation by DW James

10CFR Part 61 Analysis:

CCB Filters; RCS Crud; Dry Active Waste; Primary Resin
Trending for Shifts in Scaling Factors IAW RP-AA-605) for 4th quarter 2015 thru 2d Quarter 2017

Training:

HAZSEC, DOT Security Awareness and Transportation Security Plan
NRWSHP1000, Rev 004, DOT/79-19 Training for Support of Radioactive and Asbestos Shipments

Assignment Reports:

02589421; 03979667; 04029564; 04002988; 03960883; 02738053; 02682041; 02706967;
02700559; 02672623

Shipments:

RS-16-060-IRS-17-075-IRS-17-080-IRS-17-081-IRS-17-082-I

Section 4OA2: Problem Identification and Resolution

Procedures

IC-57.1, MS-V-3A – F Actuator Testing, Revision 1
MA-AA-743-310, Diagnostic Testing and Evaluation of Air Operated Valves, Revision 6
PI-AA-120, Issue Identification and Screening Process, Revision 7
PI-AA-125, Corrective Action Program (CAP) Procedure, Revision 5

Drawings

302-645, Decay Heat Flow Diagram Closed Cycle Cooling, Revision 39
308-874, Remote Manual Loaders DC-V-2 A/B and DC-V-65 A/B, Revision 5
302-279, Instrument Air Flow Diagram Auxiliary Building End Users, Revision 17

Miscellaneous

47-1167122-00, Main Steam Pressure Control Review, B&WOG Safety and Performance
Improvement Program, Revision 0
CS-2-31, System Design Specification – General Specification for Turbine Bypass System,
December 12, 1968
Letter C311-90-2121, Three Mile Island Nuclear Station, Unit 1 Technical Specification Change
Request No. 183, March 25, 1991
Letter C311-91-3090, Amendment 162 Turbine Bypass Valve Operability – TSCR 183
Memo 5450-91-0016, Evaluation of TMI-1 Turbine Bypass Valve Requirements, March 18, 1991
Memo 5300-87-511A, SPIP Recommendation TR-174-MSS Valve Opening Time Acceptance
Criteria, January 14, 1988
PIIM 2017-0459, Industrial Safety (2017-2018)
SDBD-T1-411, Main Steam System Design Basis Document, Revision 7
SE-000412-001, Turbine Bypass Valves – Allowable Outage Time, 1

Issue Reports:

| | | | | | |
|----------|----------|----------|----------|----------|----------|
| 02589911 | 02447409 | 04070093 | 04025781 | 04054244 | 04058290 |
| 04047110 | 04017619 | 04057460 | 04053268 | 04056346 | |
| 03948387 | | | | | |

Work Order:

04689421

LIST OF ACRONYMS

| | |
|-------|--------------------------------------|
| CAP | corrective action program |
| CRDM | control rod drive mechanism |
| CFR | <i>Code of Federal Regulations</i> |
| EAL | emergency action level |
| IMC | Inspection Manual Chapter |
| IR | inspection report |
| NRC | Nuclear Regulatory Commission |
| SDP | significance determination process |
| SSC | structure, system, and component |
| UFSAR | updated final safety analysis report |